

**KEYS TO THE FLORA OF FLORIDA -- 9, *OXALIS*
(OXALIDACEAE)**

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ABSTRACT

Oxalis (Oxalidaceae) is represented in Florida by 8 species, with *O. corniculata* treated as consisting of 2 varieties and *O. dillenii* of 2 subspecies. Extended commentary is provided regarding the correct typification of *O. stricta*, with brief discussion addressing the nomenclature of other species. An amplified key is given to the Florida taxa. Two species are excluded.

KEY WORDS: *Oxalis*, Oxalidaceae, Florida flora.

Oxalis (Oxalidaceae) in Florida is a moderate sized, readily recognized genus with some species sharply defined and others subtly distinguished and intergrading, some names consistently applied and others wholly conflicting depending on which student of the genus is considered authoritative. Though K. R. Robertson (J. Arnold Arbor. 52:649-665. 1971) excellently summarized the then-current nomenclature of the southeastern species as seen by G. Eiten (Taxon 4:99-105. 1955; Amer. Midl. Nat. 69:257-309. 1963; see also: Ph.D. diss., Columbia Univ. 1959), a later worker, A. Lourteig (Phytologia 42:57-198. 1979), has significantly challenged the application of certain important species. It is believed the present study may be the first subsequent effort to resolve the differences in interpretation between these two authors.

Eiten (1955) has typified *Oxalis stricta* L. (1753) as the largely northern, erect plant with septate hairs and slender fleshy rhizomes. A very different conclusion was reached by Lourteig (1979).

Two species are involved: an erect septate-haired plant common in both America and Europe (and thus likely familiar to Linnaeus), here called *Oxalis stricta* (by Lourteig called *O. fontana*); and a lax stemmed nonseptate-haired plant native to America and introduced rarely to Europe, here called *O. dillenii* (by Lourteig called *O. stricta*). [The plants are unmistakably different on a significant suite of characters. The hair character, not the most obvious, is used here only as a convenient label.] Linnaeus (1753:435) cited with his new *O. stricta* the pre-Linnaean publications of Gronovius (1743), Tournefort (1700), and Morison (1680) and, by implication, their associated specimens and plates; at that time he possessed no specimens of his own. The underlying specimens and illustrations differ; it is agreed (Eiten, Lourteig) that the Gronovius reference is to a nonseptate specimen within the circumscription of *O. dillenii*, while Morison's plate corresponds to the septate-haired taxon. [The authors either did not search the herbaria of Morison (OXF) and Tournefort (P), or found nothing. Their (unstated) presumption appears to have been that Morison left no specimen and Tournefort had neither an illustration nor surviving specimen.] Later, after publishing *O. stricta*, Linnaeus obtained a specimen of the septate-haired plant (LINN 600.33) which he marked as "stricta."

Conflict centers on application of I.C.B.N. (Art. 9.2), the criteria for selecting a lectotype when more than one specimen or illustration was available to the original author. Eiten (1955) noted that B. L. Robinson (J. Bot. 44:386. 1906) had selected as lectotype a Virginia specimen of Gronovius (BM: Clayton 474), the nonseptate-haired plant, but argued that this selection was contrary to Linnaeus's intent. He then selected as lectotype the Morison plate (t. 17, f. 3) of the erect septate-haired plant. This action led him to use *O. stricta* and *O. dillenii* Jacq. (1794) for the septate-haired and nonseptate-haired plants respectively. Lourteig (1979:60) was not persuaded. She -- without reference to the actions by Robinson or Eiten -- argued that Linnaeus

had worked with Gronovius (and, by implication, was familiar with his specimen), while it was "unlikely he had in mind the specimens of Tournefort and of Morison;" she selected the Gronovius specimen as lectotype. She then used *O. fontana* Bunge (1833) and *O. stricta* for the septate- and nonseptate-haired plants, respectively.

Although a lectotype may be superceded if original type materials are rediscovered or if one can show that the lectotype is in serious conflict with the protologue (I.C.B.N., Art. 9.17), it is not common for authors to propose reversal of their predecessor's lectotypifications. The present situation is further unusual in that argument is made for a double reversal -- Eiten (1955) of Robinson (1906), and Lourteig (1979) of Eiten (1955). It must tax even the nomenclaturally adept reader to follow the arguments and to decide whether to use *O. stricta* and *O. dillenii* for the septate and nonseptate plants, as did Eiten, or use *O. fontana* and *O. stricta*, as did Lourteig. Practice, as in so many other examples, has been for writers to take the easier pathway and docilely to follow the conclusions of the latest author. Thus, after Eiten (1955, 1963), American writers commonly used *O. stricta* for the septate-haired plant, and after Lourteig (1979) -- without a whimper of protest or, for that matter, indication of understanding -- have employed that name for the nonseptate-haired plant. Eiten's perhaps excessively detailed style, and Lourteig's failure to mention Eiten's contrary action or to refute the specifics of his argument, is not helpful.

But even with the complexity of the arguments as presented, still other factors may be mentioned. Though a type may be a specimen or an illustration (I.C.B.N., Art. 8.1), the superiority of actual plant material is well appreciated; had no lectotype yet been chosen, selection of the nonseptate Gronovius specimen over the Morison plate would be favored. That preference, though not in itself determining typification, may have influenced Robinson (1906) in his selection as type the Virginia specimen rather than the European illustration. Of greater weight, however, and pointing in the opposite direction, is the probability, not well brought out by either author, that Linnaeus would likely have known the plant often found as a weed in European gardens, added later to his herbarium, and illustrated by Morison, while

he would have encountered the nonseptate-haired American introduction only by brief contact with the Gronovius specimen, if at all. Further, his epithet is apt only for the European plant; that species is quite erect, or strictus (at least when young), while the plant represented by the Gronovius specimen is invariably lax and sprawling. Additional importance can be attributed to the dominant (but not universal) European practice of recognizing the plant common there as *O. stricta*.

One thus has the choice of accepting the earlier Robinson lectotypification and typifying *O. stricta* as a plant Linnaeus scarcely (or never) knew, or rejecting that lectotypification and re-lectotypifying *O. stricta* as the plant familiar in Europe and probably to Linnaeus. The advantages of the latter choice are obvious. Stability without doing violence to nomenclatural precision is best attained by rejection of the early Robinson (1906) lectotypification of the nonseptate-haired plant (per Eiten, 1955), and selection of the erect, septate-haired plant common both in Europe and eastern North America (and introduced into Florida) as the basis for the name *Oxalis stricta* L.

The judgment of Eiten (1963) is cautiously accepted here that variation within *Oxalis dillenii* is best apportioned by recognition of ssp. *dillenii* and ssp. *filipes*. In contrast, Lourteig (1979) held these taxa at specific rank, with different names; she recognized *O. stricta* (as discussed above) and *O. florida* Salisb. The differences (in pubescence, and size and robustness of the plants, as noted in the key) are appreciable and intermediates seem few. In respects ssp. *filipes* is closer to *O. corniculata* than to ssp. *dillenii* (Eiten, 1963:268). Lourteig's unwillingness to address Eiten's arguments leaves one reluctant to endorse her conclusions and nomenclature. Yet it would not appear unreasonable for one to recognize the two taxa as species -- as have essentially all previous authors -- with the names *O. dillenii* and *O. florida*. [Eiten (1963:301) was incorrect in claiming *O. florida* is superfluous (I.C.B.N., Art. 52.1). The name cited in synonymy by Salisbury (1796) was pre-Linnaean which, since not available for his use, does not disturb the legitimacy of *O. florida*.]

The assignment of *Oxalis corniculata* L. (1753) is now established by Eiten's (1955) lectotypification of the name. In Florida two distinct forms occur: leaves green, variable in size, fruits glabrous; and leaves bronze-purple, small, fruits long-pubescent. Eiten (pers. comm., Oct 1967) has been unwilling to assign varietal names. Lourteig (1979) treated these taxa as *O. corniculata* var. *corniculata*, and var. *atropurpurea* Planch. (incl. *Xanthoxalis Langloisii*); she also recognized var. *villosa* (Bieb.) Hohen.

Decision has been deferred as to proper treatment of *Oxalis priceae* Small. This name represents a complex of perennial (rhizomatous), relatively large flowered, little-known taxa usually restricted to undisturbed woodlands and too easily dismissed as waifs of *O. dillenii* or other more common species. Eiten (1963) divided *O. priceae* into three subspecies distinguished on features of stem and pedicel pubescence. Two, ssp. *colorea* (Small) Eiten, and ssp. *texana* (Small) Eiten, were reported to reach Florida. Lourteig (1979) -- again without reference to the arguments of Eiten -- recognized three species, one with two subspecies. Comparison is difficult because this second author interpreted both the taxa and their types quite differently and permitted no taxa to bear the names assigned by the first author. Further study may justify some degree of separation. [D. M. Mulcahy (Amer. J. Bot. 51:1045-1050. 1964), incidental to his primary interest in flower form, reported variations in growth patterns and heterostyly among the three taxa.] But, at least within Florida, the difference are so subtle and intergrading that they are not believed worthy of recognition.

The renaming of *Oxalis priceae* as *O. lyonii* Pursh (1813), by Lourteig (1979), is in error. The type of *O. lyonii* was from Cumberland Island, an early-settlement plantation in southeastern coastal Georgia. Lourteig, finding Pursh's type to be lost and lacking other collections from near the type locality that she could assign to *O. lyonii*, neotypified her interpretation of the name with a Mississippi specimen of Eiten's ssp. *texana*. However that entity, a rather uncommon perennial of dry, usually undisturbed woodlands, apparently does not extend eastward to Florida, much less the Atlantic

coastal plain. [Reports of its presence in Florida are based on misidentified specimens (Cooley - USF) or specimens of ssp. *colorea*.] Pursh's description of *O. lyonii* is mostly language appropriate only to the genus, but contains phrases ("...caule ramoso decumbente...siliquis tomentosis...") exactly fitting *O. dillenii*, a species common on agricultural soils of eastern Georgia. [*O. priceae* is erect above its rhizomatous base, with finely pubescent fruits.] Though claimed otherwise by Lourteig, no part of Pursh's description uniquely implies he had in hand any member of the *O. priceae* complex. True *O. lyonii* is probably a synonym of *O. dillenii*, as has been supposed by previous authors (Eiten, 1963.; etc.). Lourteig's neotype is clearly in conflict with the protologue of *O. lyonii*, and should be set aside. If the complex is left undivided, *O. priceae* retains its priority.

Oxalis violacea is so clearly a native in the northern states that it is easily assumed to be so in Florida. Yet its habitat here is essentially confined to roadsides and other disturbed, widely separated areas. Northward, its coherent range largely stops in mid-Georgia (S. B. Jones & N. C. Coile, Distribution of the Vascular Flora of Georgia. 1988). It is best treated as introduced.

The introduced South American species of Sect. *Ionoxalis* are perhaps best addressed by M. E. Denton (Publ. Mus. Michigan State Univ. Biol. 4:455-615. 1973). Introduced species are denoted by an *.

The "amplified key" format employed here is designed to present in compact form the basic morphological framework of a conventional dichotomous key, as well as data on habitat, range, and frequency. This paper is a continuation of a series begun in the 1970s (vide Phytologia 35:404-413. 1977). I wish to thank David W. Hall and Kent D. Perkins for constructively reviewing the manuscript, and to acknowledge extended correspondence with Dr. George Eiten and his assistance with certain identifications, though all nomenclatural interpretations are my own.

Oxalis L. Wood Sorrels

1. Petals yellow to orange-yellow; sepals without orange dots (tubercles) at apex; plants annual or short-lived perennial; base fibrous or of thin rhizomes.....Sect. *Corniculatae*

2. Hairs of petioles and stem septate (multicellular); stems erect, arising from a slender shallow rhizome; annual or short-lived perennial herb. Floodplains. Mid-panhandle (Liberty County: Apalachicola River); rare. Summer-fall.....**Oxalis stricta* L. [*O. europaea* Jord.; *O. fontana* Bunge; *Xanthoxalis cymosa* Small]

2. Hairs of petiole and stem non-septate (unicellular); stems creeping or decumbent from fibrous roots, or erect from a perennial base (if erect, corolla >12 mm. long).

3. Corolla <11 mm. long; longer internal flower structures (either stamens or pistil) <5 mm. long; stems creeping or decumbent, from fibrous roots.

4. Mature capsules gradually tapering to apex; seeds and their transverse ridges uniformly brown; stems creeping, rooting at nodes; perennial herb. Moist soil of gardens, lawns. All year.....**Oxalis corniculata* L.
 - 4a. Leaflets ca. 1.5 cm. broad, green; stems both creeping and ascending-erect. Throughout Florida: commonvar. *corniculata* [*Xanthoxalis corniculata* (L.) Small]

 - 4a. Leaflets ca. 1 cm. broad, dark maroon; stems closely creeping. Throughout Florida; commonvar. *atropurpurea* Planch. [*Xanthoxalis langloisii* Small]

4. Mature capsules with parallel sides, abruptly tapering to apex; seeds brown with gray or white crests or distinct spots on transverse ridges; stems often decumbent at base but only rarely rooting at nodes; annual or perennial herb. Gardens, pastures, moist disturbed areas. Spring-summer.
.....*Oxalis dillenii* Jacq.
- 4b. Capsules densely pilose; stem hairs strictly appressed upwards; plants relatively robust (stems 1.5-2 mm. thick). Nearly throughout (south to Polk, Brevard counties; excl. south peninsula); common...ssp. *dillenii* [*O. lyonii* Pursh; *Xanthoxalis stricta*, misapplied]
- 4b. Capsules partially or completely glabrous; some or all stem hairs retrorse; plants relatively slender (stems 1-1.5 mm. thick). Throughout Florida; common.....
.....ssp. *filipes* (Small) Eiten
[*O. florida* Salisb.; *Xanthoxalis brittoniae* Small; *Xanthoxalis filipes* Small]
3. Corolla 12-14 mm. long; longer internal flower structures (either stamens or pistil) 6-8 mm. long; stems erect from base, with short rhizomes; perennial herb. Mesic woodlands. Panhandle (Escambia County, east to Gadsden, Liberty counties); infrequent. Spring. Restricted to undisturbed habitats and often overlooked.....*Oxalis priceae* Small
[*O. lyonii*, misapplied; *Xanthoxalis coloreae* Small; *Xanthoxalis macrantha*, misapplied; *Xanthoxalis priceae* Small; *Xanthoxalis recurva*, misapplied]
1. Petals pink to lavender; sepals usually with orange dots (tubercles) at apex; plants perennial; base stocky, tuberous or bulbous.....
.....Sect. *Ionoxalis*

5. Leaflets angular obcordate or obdeltoid; petals pinkish purple; sepals 4 mm. long, with distinct orange dot at tips; perennial herb. Moist waste areas, fencerows. Peninsula (Duval, Alachua counties, south to Dade County); infrequent. Spring-summer.....
.....* *Oxalis intermedia* A. Rich.

[*O. latifolia*, misapplied; *Ionoxalis intermedia* (A. Rich.) Small]

5. Leaflets rounded obcordate.

6. Plant arising from a segmented, woody taproot; leaflets <2.5 cm. broad; sepals densely appressed-pubescent; petals red or pinkish red (rarely white); inflorescences delicate, usually compound, often many (to 100) per plant; perennial herb. Moist disturbed areas. West and mid-panhandle (Escambia to Leon, Franklin counties); rare. Spring...* *Oxalis rubra* St.-Hil.

6. Plant arising from a fleshy bulb or cluster of bulblets; sepals glabrous or sparsely pubescent toward base; inflorescences usually few (1-10) per plant.

7. Leaflets 2.5-5.0 cm. broad; inflorescence compound; petals purplish pink; sepals 5 mm. long, with no or indistinct orange dot (tubercle) at tips; perennial herb. Fencerows, dooryards, moist disturbed areas. Throughout; mostly near habitations, where often common. Winter-spring.....
.....* *Oxalis corymbosa* DC.
[*O. debilis* HBK. var. *corymbosa* (DC.) Lourteig; *O. martiana* Zucc.; *Ionoxalis Martiana* (Zucc.) Small]

7. Leaflets 1.5-2.0 cm. broad; inflorescence simple; petals violet; sepals 3 mm. long, with distinct orange dot (tubercle) at tips; perennial herb. Dry waste areas, rocky outcrops. Mid-panhandle (Calhoun, Jackson counties, scattered east to Putnam County); rare. Spring, fall. Not persisting.
.....VIOLET WOOD SORREL..* *Oxalis violacea* L.

[*Ionoxalis violacea* (L.) Small]

Excluded names:

Oxalis pes-caprae L. Buttercup Oxalis

Oxalis cernua Thunb.

Bolboxalis cernua (Thunb.) Small

Reported for "waste-places and cult. grounds, N. Fla." (Small, 1933).
Perhaps once cultivated. No Florida specimens are known.

Oxalis triangularis St. Hil.

Reported [as ssp. *papilionacea* (Hoffmanns. ex Zucc.) Lourteig] for
Leon Co. (Wunderlin, Hansen & Anderson, 2002), based upon a 2001
specimen (Anderson 19691 - FSU). Stated as "several plants," but
without clear evidence of naturalization.